Remarks

The Applicants have cancelled all of Claims 1, 2, 33, 58 and 61 – 120. New Claims 121 – 153 have been added. Entry into the Official File and examination on the merits is respectfully requested.

The Applicants respectfully submit that cancellation of the previous claims and addition of the new claims renders all of the prior claim objections and rejections moot. Nonetheless, with respect to the claim objections and the claim rejections under 35 U.S.C. §112, the Applicants have kept such objections and rejections in mind in drafting the new claims and have endeavored to avoid similar objectionable language.

Inasmuch as the new claims of record have not been rejected, the Applicants are not required to address the 35 U.S.C. §§102 and 103 rejections. Nonetheless, the Applicants offer for the Examiner's convenience general comments concerning selected ones of the prior art previously used to reject the now cancelled claims. In particular, the Applicants believe that Norris is inapplicable to the newly submitted claims. There are fundamental reasons for the inapplicability of Norris as set forth below.

As the Examiner helpfully notes in Paragraph 7 of the Official Action, Norris discloses an apparatus for producing a cathode ray tube (CRT) display. Norris does not disclose an apparatus for producing a plasma display. CRT and plasma displays are quite different from each other in their construction. A CRT display has no space between spaced apart barrier ribs filled with a gas. However, a plasma display inherently has a space between spaced apart barrier ribs filled with a gas as explained in the Applicants' Specification at page 1, line 5 to page 2, line 11; page 17, bottom line to page 18, line 2; and page 45, line 2 to page 46, line 1.

The device for producing a CRT display disclosed in Norris is explained below. Column 2, lines 25 – 29 state "As seen in Fig. 1 a movable track 11 having a clamping system 13 attached thereto is provided for fixing a CRT faceplate 15 in a predetermined position for the movement of the CRT faceplate (illustrated as being flat and skirtless), above a meniscus assembly 17". (Emphasis added.) Column 2, lines 46 – 49 state "As seen in Fig. 2, solutions or suspensions of screen elements are pumped through the tubules 19 creating menisci 20BL, 20R, 20B, 20G of screen element liquids atop the tubules". (Emphasis added.) Column 2, lines 56 – 58 state "Because the screening surface faces downwardly, airborne particulate contamination of the screen is minimized". (Emphasis added.) Column 3, lines 36 – 40 state "Because the screening surface of the faceplate 15 is facing down towards the ground, gravity helps the phosphor strips assume a desirable drop shape with a protuberant surface profile which aids in preventing cross-contamination". (Emphasis added.)

As can be seen from the above disclosure, in the apparatus for producing a CRT display disclosed in Norris, a meniscus assembly 17 is arranged to be located below and face the screening surface 16 of the faceplate 15. Such a positioning relationship between the meniscus assembly 17 and the screening surface 16 is needed in the apparatus for producing a CRT display to utilize gravity and form the desirable drop shape having the protuberant surface profile.

In sharp contrast, in the method or apparatus for producing a substrate of a plasma display of this invention, a nozzle having outlet holes is arranged to be located above and face a table to be mounted on a base substrate. This relationship between the nozzle and barrier ribs provided on the base substrate is directly inverse to the apparatus for producing a CRT display disclosed in Norris.

This sharp difference makes it clear that this invention is not anticipated by Norris.

The Applicants respectfully submit that Miyake is inapplicable to the newly submitted claims, whether taken individually or collectively with Norris. The new claims more clearly define, respectively, that the nozzle is located above and faces the barrier ribs provided on the base substrate.

As noted above, Norris discloses a method and apparatus for producing a CRT display which has a completely different construction from a plasma display. Further, Norris discloses a method and apparatus for producing a CRT display which is constructed with the meniscus assembly 17 placed below and facing the screening surface 16 of the faceplate 15. In sharp contrast, in this invention for producing a substrate of a plasma display, the nozzle having outlet holes is placed above and faces the barrier ribs provided on the base substrate. This relationship between the nozzle and the barrier ribs provided on the base substrate is inverse to the method and apparatus for producing a CRT display disclosed in Norris. From this difference, those skilled in the art can glean that Norris does not disclose, teach or suggest the relationship between the nozzle and the barrier ribs provided on the base substrate defined in this invention.

The Applicants acknowledge that Miyake discloses a plasma display and a method and apparatus for production thereof. Column 11, lines 28 - 30 of Miyake explain that "said cell barriers are formed by successively printing a phosphor-containing material in an overlapping manner by a screen printing method, and said barriers are composed only of the phosphor-containing material". This means that the plasma display of Miyake is produced by a screen printing method. In a screen printing method, it is inherent that a phosphor containing paste is squeegeed through a wire form to print a screen. Meshed portions in the wire form are used as a multiplicity of holes for passing through the paste and forming a screen pattern.

In this context, it is a very important matter that the wire form is placed and fixed on a base substrate. The wire form, therefore, does not move to the base substrate together with a paste applicator or, if possible, but quite rarely, moves together with the base substrate to the paste applicator in a relative movement between them. As a result, the outlet holes do not move together with the paste applicator. In sharp contrast, the outlet holes contained in the nozzle in this invention move together with the nozzle, since the outlet holes are contained in the nozzle. This makes it clear that screen printing methods are quite different from the method or apparatus of this invention in which the outlet holes are moved to the barrier ribs provided on the substrate.

Additionally, in the plasma display disclosed in Miyake, the cell barriers are formed by successively printing a phosphor-containing material in an overlapping manner by a screen printing method. This means that the plasma display disclosed in Miyake has the phosphor containing material which is provided only at the barriers and is not provided in the spaces between the barrier ribs. From this it is understood that the method and apparatus for producing a plasma display disclosed in Miyake is different from the method and apparatus for producing a substrate of plasma display of this invention.

Still further, in Norris, it is positively explained in Column 1, lines 54 – 58 that the method and apparatus for producing a CRT disclosed therein provide a system for production of CRT line screens without printing with apparatus which may distort under pressures of printing which occurs in a screen printing method. This means that in Norris, there is a positive rejection to combine a method and apparatus for producing a CRT display of Norris with the screen printing method disclosed in Miyake.

The Applicants acknowledge that Nanto discloses that a multi-nozzle may be used in which a plurality (for example, 5 - 30) of nozzles are arranged with a predetermined coating pitch

along the direction perpendicular to the ribs. The Applicants also acknowledge that Nanto teaches two kinds of multi-nozzles. One multi-nozzle is disclosed at Column 11, lines 40 - 47 together with Figs. 15 and 16. The other multi-nozzle is disclosed from Column 12, line 62 to Column 13, line 12 together with Figs. 20, 21 and 22. The Applicants understand that the multi-nozzle disclosed in Fig. 16 comprises a plurality of needle type nozzles 56a protruding from the bottom surface of the syringe 57a and the multi-nozzle disclosed in Fig. 22 comprises a plurality of outlet holes 56b formed in the bottom plate of the head 63 in which the bottom plate is a flat plate.

On the other hand, the Applicants surprisingly discovered that, when the number of the needle type nozzles contained in a nozzle exceeded 30, it became difficult to produce a substrate of a plasma display having precise coatings between the barrier ribs. After that, the Applicants tried to change the nozzle having the needle type nozzles to a nozzle having outlet holes provided in a flat plate and discovered that, when the number of the outlet hole was from 150 to 2000, it was easy to produce a substrate of plasma display having precise coatings between the barrier ribs.

The Applicants agree that it is possible to produce a plasma display having precise coatings between barrier ribs based on a nozzle having 5 - 30 needle type nozzles as disclosed in Nanto. However, in Nanto there are no teachings or suggestions that, when the number of needle type nozzle exceeds 30, it becomes difficult to produce a substrate of plasma display having precise coatings between barrier ribs. Additionally, although Nanto discloses a nozzle having outlet holes provided in a flat plate as shown with Figs. 20 - 22, there are no teachings or suggestions in Nanto that the problem of the needle type nozzle is solved by using a nozzle having outlet holes provided in a flat plate.

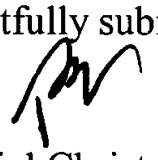
The Applicants recite "formed in a flat plate" in their claims. This language is supported by the description at page 5, line 4 from the bottom; page 10, lines 13 - 14, and page 60, lines 5 - 6. This important discovery of the Applicants is not taught or suggested by Nanto.

The Applicants note a number of additional rejections that are based on the hypothetical combination of Ravi-Chandar, Mettenbrink, Osaka, Igarashi, Yamaura, Shinoda, Mizuno and Silverbrook with Nanto. The Applicants respectfully submit that these hypothetical combinations do nothing to cure the deficiencies set forth above with respect to Nanto. For example, Nanto fails to teach or suggest a nozzle having from 150 to 2000 outlet holes formed in a flat plate as discussed above. None of the secondary references provide teachings or suggestions to one of ordinary skill in the art that would lead to the claimed nozzle having from 150 to 2000 outlet holes formed in a flat plate. Thus, the Applicants respectfully submit that all of those combinations are inapplicable to the newly submitted claims.

With respect to the hypothetical combination of Shinoda with Norris, the Applicants respectfully submit, as noted above, that Norris does not teach or suggest a nozzle located above and facing the barrier ribs provided on the base substrate. Shinoda discloses a method or apparatus for producing a plasma display based on coating phosphor paste on a substrate with a screen printing method. As already noted above, in screen printing methods, holes through which a paste is passed are placed and fixed on barrier ribs and are not moved together with a squeezer. Thus, Shinoda is completely different from the newly submitted claims in which the outlet holes are moved together with the nozzle relative to the barrier ribs. Therefore, the Applicants respectfully submit that one of ordinary skill in the art would not make the hypothetical combination.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



T. Daniel Christenbury
Reg. No. 31,750
Attorney for Applicants

TDC:lh
(215) 656-3381